ZooKeys 25: 37–48 (2009)
doi: 10.3897/zookeys.25.276
www.pensoftonline.net/zookeys

RESEARCH ARTICLE

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ZooKeys
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Rediscovery of *Clivina morio* Dejean with the description of *Leucocara*, a new subgenus of *Clivina* Latreille (Coleoptera, Carabidae, Clivinini)

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Academic editor: *Terry Erwin* | Received 14 September 2009 | Accepted 19 October 2009 | Published 23 October 2009

urn:lsid:zoobank.org:pub:3B8DC153-FE0E-4F43-809E-6A7BBCCBEA0E

Citation: Bousquet Y (2009) Rediscovery of *Clivina morio* Dejean with the description of *Leucocara*, a new subgenus of *Clivina* Latreille (Coleoptera, Carabidae, Clivinini). ZooKeys 25: 37–48. doi: 10.3897/zookeys.25.276

Abstract

Leucocara, a new subgenus of *Clivina* Latreille, is established for *C. americana* Dejean and its relatives, whose collective geographical range includes the Western Hemisphere Nearctic Region and the Eastern Hemisphere Palaearctic, Oriental, and Afrotropical Regions. Previously, these taxa were included in the subgenus *Reichardtula* Whitehead, 1977, a taxon now confined to the Eastern Hemisphere. Members of *Leucocara* differ from those of other Nearctic *Clivina* by the presence of a small, apically truncate preapical protuberance on the mesotibia with its seta inserted apically. *Clivina morio*, previously known only from the holotype, is reported here from Louisiana and Texas, confirming its presence on the North American continent; the species is also included in *Leucocara*. The following new synonymies are proposed: *C. dilutipennis* Putzeys, 1866, *C. insularis* Jacquelin du Val, 1857, *C. klugii* Putzeys, 1846, *C. sculptifrons* Putzeys, 1846 with *C. fasciata* Putzeys, 1846 and *C. morula* LeConte, 1857 with *C. americana* Dejean, 1831.

Keywords

new subgenus, *Clivina*, *Clivina morio*, new synonymies, North America

Introduction

Clivina morio was described in 1831 by Count Dejean from a single specimen reported from "Amérique septentrionale." The species was transferred to the genus *Ardistomis*

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Putzeys by Putzeys (1866: 205). Subsequently it was recorded from Lancaster County in Pennsylvania (Rathvon 1869: 524), Georgia (LeConte 1879: 32), the vicinity of New York city (Leng and Beutenmuller 1893: 135), Fort Myers in Florida (Leng 1915: 571), and Thomasville in Georgia (Fattig 1949: 15). Bousquet (2006) reviewed the Nearctic species of Ardistomina based on materials from 11 major North American collections, including the California Academy of Sciences, the Canadian National Collection of Insects, the Florida State Collection of Arthropods, the Museum of Comparative Zoology, and the National Museum of Natural History, and was unable to find a single specimen conspecific with the holotype of *C. morio*. This led him to believe the species may inhabit the Neotropical Region and that the region originally mentioned by Dejean was in error. Bousquet (2006) transferred the species back to the genus *Clivina* Latreille but did not provide a subgeneric placement for it.

In 2008, Igor S. Sokolov found two specimens in the Louisiana State Arthropod Collection that belong to *C. morio* and sent them to me for confirmation. This finding led me to investigate the systematic position of this species and its putative relatives in both the Western and Eastern Hemispheres.

The Western Hemisphere subgenera of *Clivina*

As discussed by Ball (2001), the Western Hemisphere species of *Clivina* Latreille belong to five subgenera: *Paraclivina* Kult, *Semiclivina* Kult, *Antroforceps* Barr, *Clivina s. str.*, and *Reichardtula* Whitehead. A list of the species, assigned to the respective subgenera, is includes in Table 1. Members of *Paraclivina* are characterized in having the mandibular scrobe distinctly laterad, the lateral bead of pronotum without posteriolateral denticle and not extended to the basal edge but extended parallel anterior to it, and the elytral interval 3 with only two discal setigerous punctures. This taxon corresponds to groups 21 and 22 of Putzeys (1866) and is indigenous to the New World. It contains at least 33 species in the Nearctic and Neotropical Regions. According to Nichols' (1988) unpublished Ph.D. thesis, the names *C. dilutipennis* Putzeys, *C. insularis* Jacquelin du Val, *C. klugii* Putzeys, and *C. sculptifrons* Putzeys are junior synonyms of *C. fasciata* Putzeys **[new synonymy]**.

The subgenus *Semiclivina* is characterized mainly by the presence of a narrow, sculptured band [deep longitudinal or submarginal furrow of Kult (1947: 31), submarginal ridge of Nichols (1988: 154), longitudinal carina of Ball (2001: 136)] extended more or less parallel to the lateral edge. This state is likely synapomorphic and suggests that the taxon is monophyletic. The group is indigenous to the Western Hemisphere and includes at least nine species (Table 1). Probably many other Middle American and South American species, placed by Putzeys (1866) in his group 24, belong to this subgenus.

Antroforceps Barr is indigenous to northeastern Mexico (Tamaulipas) and eastern United States. It includes three species (Table 1) and is recognized by the bidentiform lateral edge of pronotum posteriorly and bidentiform or crenulate humeri.

Table 1. List of Western Hemisphere *Clivina* with their subgeneric assignment

***Clivina* Taxa**	**Subgenera**
acuducta Haldeman, 1843	*Leucocara*
addita Darlington, 1934	*Semiclivina*
adstricta Putzeys, 1866	*Semiclivina* ?
amazonica Putzeys, 1861	*Semiclivina* ?
americana Dejean, 1831	*Leucocara*
antennaria Putzeys, 1866	*Semiclivina* ?
armata Putzeys, 1846	*Semiclivina* ?
batesi Putzeys, 1866	*Semiclivina* ?
bicolor Putzeys, 1866	*Paraclivina*
bidentata Putzeys, 1846	*Semiclivina* ?
bifoveata Putzeys, 1861	?
biguttata Putzeys, 1866	*Paraclivina*
bipustulata Fabricius, 1801	*Paraclivina*
bituberculata Putzeys, 1866	*Paraclivina*
bolivari Barr, 1967	*Antroforceps*
boliviensis Putzeys, 1846	?
brevicollis Putzeys, 1866	*Paraclivina*
breviuscula Putzeys, 1866	*Paraclivina*
brunnea Putzeys, 1846	*Semiclivina* ?
brunneipennis Putzeys, 1846	*Paraclivina*
burmeisteri Putzeys, 1866	*Paraclivina*
californica Van Dyke, 1825	*Leucocara*
carbonaria Putzeys, 1866	*Semiclivina* ?
collaris Herbst, 1784	*Clivina*
columbica Putzeys, 1846	*Semiclivina* ?
convexa LeConte, 1857	*Paraclivina*
cribricollis Putzeys, 1861	?
cruciata Putzeys, 1866	*Paraclivina*
cruralis Putzeys, 1866	*Semiclivina* ?
cubae Darlington, 1834	*Semiclivina*
dentifemorata Putzeys, 1846	*Semiclivina* ?
dentipes Dejean, 1831	*Semiclivina*
dissimilis Putzeys, 1866	*Semiclivina* ?
distigma Putzeys, 1866	*Paraclivina*
elongata Chaudoir, 1843	*Semiclivina*
erythropa Putzeys, 1846	?
fasciata Putzeys, 1846	*Paraclivina*
fassatii Kult, 1947	*Paraclivina*
ferrea LeConte, 1857	*Paraclivina*
fossifrons Putzeys, 1866	*Paraclivina*
fossor Linné, 1761	*Clivina*

Clivina Taxa	Subgenera
fuscicornis Putzeys, 1846	*Paraclivina*
fuscipes Putzeys, 1846	*Paraclivina*
hilaris Putzeys, 1861	?
impressefrons LeConte, 1844	*Clivina*
inaequalis Putzeys, 1866	*Paraclivina*
laeta Putzeys, 1866	?
laetipes Putzeys, 1866	*Semiclivina* ?
laticeps Putzeys, 1846	*Semiclivina* ?
latimana Putzeys, 1846	*Semiclivina* ?
latiuscula Putzeys, 1866	*Paraclivina*
lebasi Putzeys, 1846	?
limbipennis Jacquelin du Val, 1857	*Clivina* ?
longipennis Putzeys, 1861	*Semiclivina* ?
lucida Putzeys, 1866	*Paraclivina*
maculatis Putzeys, 1866	*Paraclivina*
marginipennis Putzeys, 1846	*Paraclivina*
media Putzeys, 1846	*Paraclivina*
morio Dejean, 1831	*Leucocara*
myops Bousquet, 1997	*Clivina*
nitidula Putzeys, 1866	*Semiclivina* ?
oblita Putzeys, 1866	*Semiclivina*
obscuripennis Putzeys, 1866	*Paraclivina*
oregona Fall, 1922	*Clivina*
oxyomma Putzeys, 1868	*Semiclivina*
pallida Say, 1825	*Clivina*
pampicola Putzeys, 1866	?
parvidens Putzeys, 1866	*Semiclivina* ?
parvula Putzeys, 1866	*Semiclivina* ?
planicollis LeConte, 1857	*Clivina*
planulata Putzeys, 1866	?
platensis Putzeys, 1866	*Semiclivina* ?
postica LeConte, 1848	*Paraclivina*
pravei Lutshnik, 1926	?
punctifrons Putzeys, 1866	?
punctigera LeConte, 1857	*Clivina*
punctiventris Putzeys, 1866	*Semiclivina* ?
punctulata LeConte, 1849	*Clivina*
putzeysi Csiki, 1927	*Semiclivina* ?
quadrata Putzeys, 1866	*Clivina* ?
recurvidens Putzeys, 1866	*Paraclivina*
rubicunda LeConte, 1857	*Antroforceps*
rufa LeConte, 1857	*Leucocara*

***Clivina* Taxa**	**Subgenera**
sasaji Ball, 2001	*Antroforceps*
spinipes Putzeys, 1866	?
stigmula Putzeys, 1846	*Paraclivina*
striatopunctata Dejean, 1831	*Paraclivina*
stygica Putzeys, 1866	*Semiclivina* ?
sulcipennis Putzeys, 1846	*Paraclivina*
taurina Putzeys, 1866	?
torrida Putzeys, 1866	*Paraclivina*
transversicollis Putzeys, 1866	*Paraclivina*
tridentata Putzeys, 1866	*Semiclivina* ?
tristis Putzeys, 1846	*Paraclivina*
tuberculata Putzeys, 1846	*Paraclivina*
urophthalma Putzeys, 1861	*Semiclivina*
urophthalmoides Kult, 1947	*Semiclivina*
vespertina Putzeys, 1866	*Semiclivina*

The remaining two subgenera are inadequately characterized. Adults of the nominotypical taxon lack the paramedian sulci on abdominal sternum III as in members of *Paraclivina* but contrary to those of other Western Hemisphere taxa. As presently conceived, *Clivina s. str.* is worldwide, markedly speciose, and in my opinion possibly paraphyletic, if not polyphyletic. Nine species inhabiting the Western Hemisphere are currently assigned to this subgenus (Table 1).

The only distinctive or peculiar structural character state for *Reichardtula* is that the two setigerous punctures on each side of abdominal sternum VII (the so-called "last visible sternum") are close to each other. The subgenus contains at least two distinct groups of species. One has the preapical protuberance on the mesotibia small, truncate at apex, its seta inserted apically (Fig. 2). The second group has that protuberance long, acuminate at apex, its seta inserted laterally (Fig. 3). In view of the current classification of the genus *Clivina*, I believe these two groups should each be given subgeneric rank. Because *Reichardtula* is a replacement name for *Eupalamus* Schmidt-Göbel, both have the same type species (ICZN 1999, Article 67.8) which is the Oriental *Clivina castanea* Westwood, 1837, a senior synonym of *Eupalamus clivinoides* Schmidt-Göbel the sole species originally associated with *Eupalamus*. That species, based on the description and keys to Indian species by Andrewes (1929: 353–355, 374–375), has "a spur above apex" of the mesotibia (e.g., with a relatively long protuberance) contrary to some species which are "without spur above apex" (e.g., with a small protuberance). Therefore, the species of the *americana* group (see Bousquet and Larochelle 1993: 103) are those in need of a new subgenus.

Clivina morio has a small, truncate protuberance on the mesotibia and a close examination of the new material at hand shows that the species is externally markedly similar to this species of the *americana* group. Therefore the species is placed in this group which is given herein the subgeneric name *Leucocara* (see Table 2 for list of

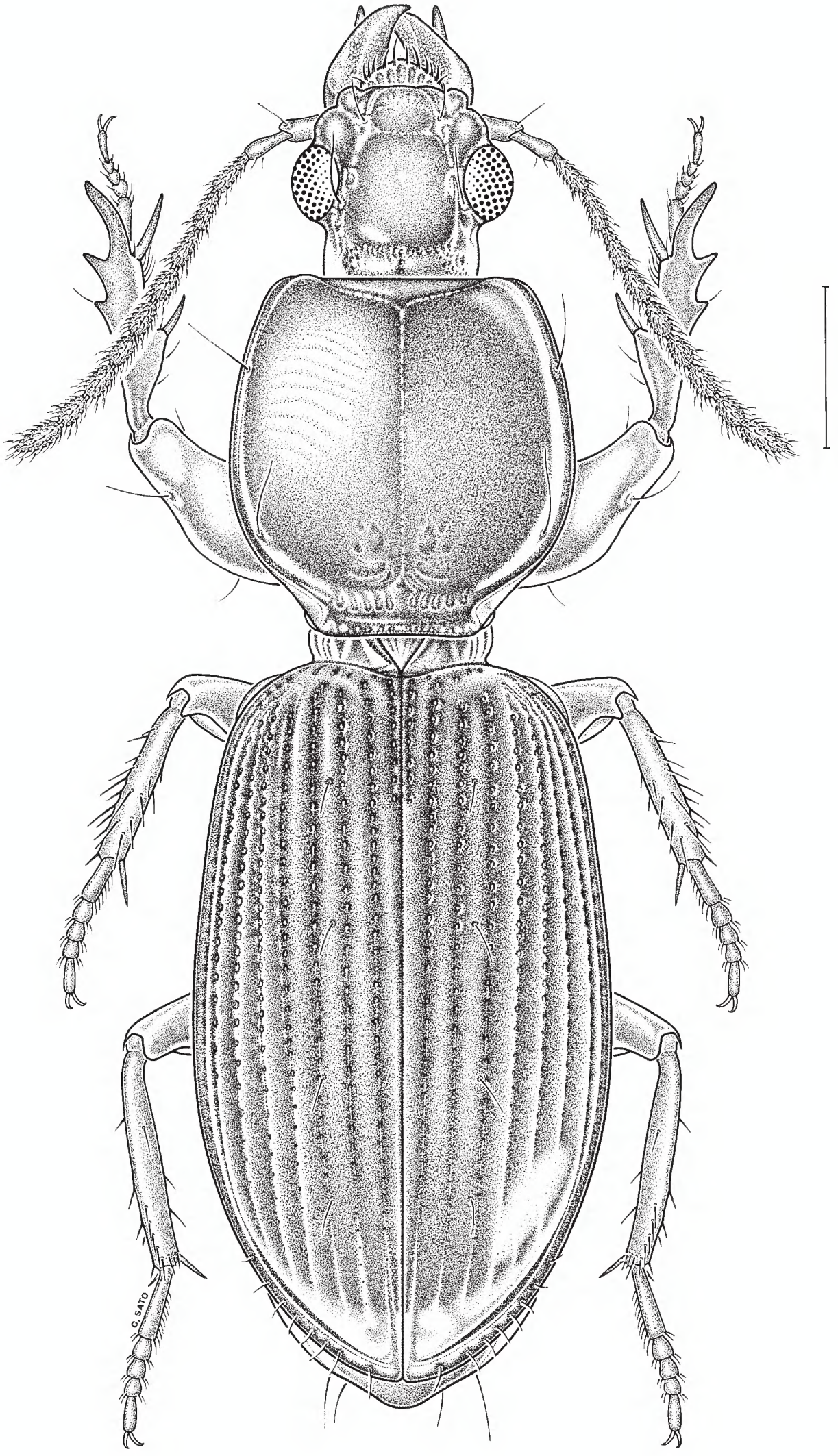


Figure 1. *Clivina* (*Leucocara*) *morio* Dejean, holotype, habitus (dorsal view). Scale bar = 1 mm

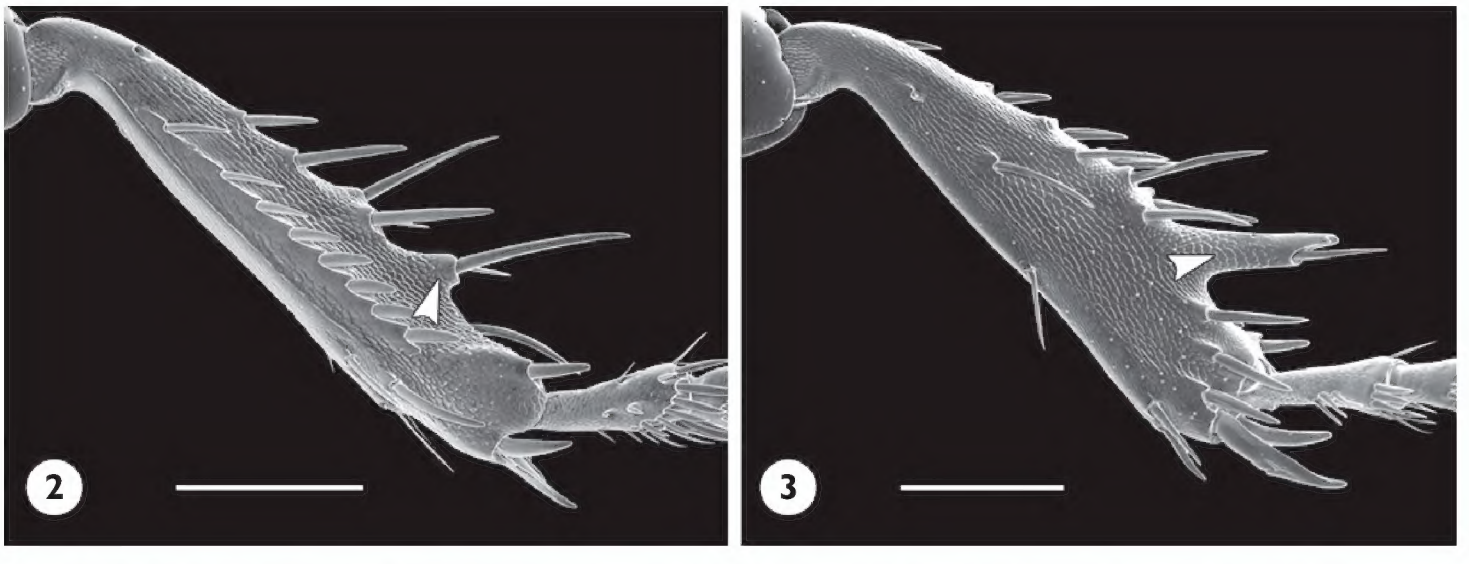
species names). This action, in effect, restricts the geographic range of subgenus *Reichardtula* to the Eastern Hemisphere.

Subgenus *Leucocara* Bousquet, subgen. n.
urn:lsid:zoobank.org:act:05AD95B8-1397-46E1-89C5-1A9CC5CD819F
Type species: *Clivina americana* Dejean, 1831 (here designated)

Etymology. From the Greek *leukos* (white) and *kara* (head). The name is proposed in memory of Donald Robert Whitehead [1938–1990] who had an interest in *Clivina* and the Clivinini in general. His family name has been used in the past to denote a scaritine genus (*Whiteheadiana* Perrault) and a curculionid genus (*Whiteheadia* Alonso-Zarazaga & Lyal).

Recognition. Members of this subgenus differ from those of other Nearctic *Clivina* by the presence of a small, apically truncate preapical protuberance on the mesotibia with its seta inserted apically.

Description. *Head.* Supraantennal lobes not prominent, distinctly posteriad anterior edge of clypeus. Lateral wings of clypeus isolated from median portion by extension of frontal impressions; median portion of clypeus coarsely beaded. Labrum with seven long setae. Mandible with scrobe depressed, not distinctly laterad, evident from dorsal aspect. Labial mentum with prominent U-shaped ridge; glossal sclerite acutely carinate medially, carina not sinuate; apex of glossal sclerite with one long seta medially; paramedian pit organs widely separate medially. *Prothorax.* Pronotum with lateral bead extended to basal edge; posteriolateral angle delimited, angulate; side without accessory dentiform projection posteriad posterior angle. Proepisternum without sculptured band. *Elytra.* Lateral gutter clearly extended inside humerus, humeral portion clearly delineated; umbilical setae not set up in ringed depressions. Interval 3 with three or four discal setae; second discal seta not adjoining stria 3 though close to it in some individuals, in most individuals rela-



Figures 2–3. Mesotibia. **2** *Clivina americana* (ventral view) **3** *Clivina fossor* (dorsal view). Scale bars = 0.2 mm

tively close to stria 2 or in middle of interval 3; interval 8 carinate toward apex and briefly toward base. Striae 4 and 5 joined at base. *Legs.* Profemur ventrally with a small dentiform projection toward apex. Mesotibia with preapical apophysis small, seta apicad (Fig. 2). *Abdomen.* Sternum III with coxal lines medially; sternum VII with preapical setae on each side proximate, distance between them less than that between medial setae.

Phylogenetic status. A small, truncate protuberance of the mesotibia (Fig. 2) is probably the plesiomorphic state among the Clivinini and does not support the idea that *Leucocara* is monophyletic. In fact, the genus *Clivina* is a large, inadequately defined complex and consequently the structural characters are difficult to polarize. Therefore, I am unable to offer any morphological evidence that *Leucocara* is natural. However, the species, at least those I have seen (see "Species included" section), are extremely similar to one another in external features and this is sufficient grounds for recognition of the group until it is subjected to phylogenetic analysis.

Geographical distribution. The known range of *Leucocara* includes the Western Hemisphere Nearctic Region, and the Eastern Hemisphere Palaearctic, Oriental, and Afrotropical Regions.

Species included. Names of species belonging to *Leucocara* are listed in Table 2. Taxonomic remarks about selected taxa are as follows.

The Western Hemisphere species

Based on Bousquet and Larochelle (1993: 103), the *americana* group contains five species in North America: *C. americana* Dejean, *C. analis* Putzeys, *C. californica* Van Dyke, *C. morula* LeConte, and *C. rufa* LeConte. However, in his unpublished thesis, Nichols (1988: 148) revalidated *C. acuducta* Haldeman (previously in synonymy with *C. americana*), synonymized *C. morula* with *C. americana* [**new synonymy**] and reinstated *C. analis* as a synonym of *C. americana*. This leaves the *americana* group with five valid North American species: *acuducta*, *americana*, *californica*, *morio*, and *rufa*. All these species, except *C. californica* which is known only from the type locality in Lake County, California, are found in the eastern part of the continent. The group, as far as known, as no representatives in the Neotropical Region.

Clivina morio was previously known from the holotype only (Bousquet 2006: 25). I have now seen three additional specimens. Two were collected at UV light in Louisiana, 4.2 mi. NE of Abita Springs, St. Tammany Parish, by V. Brou, one on May 30, 2001, the other one on June 2, 1988. These specimens are in the Louisiana State Arthropod collection, Baton Rouge. The third specimen is in the Canadian National Collection of Insects, Ottawa, and was collected at 12 mi. SW of Lufkin, Trinity Co., Texas on 22 April 1976 by A. Smetana. The species can be distinguished from the other eastern North American species of *Leucocara* by its size and shorter metepisternum. The four specimens studied of *C. morio* range between 7.0 and 8.5 mm in size while the largest specimen seen of the other species reach only 6.4 mm. The ratio length of

Table 2. List of species belonging or assumed to belong to *Leucocara*. Species marked with an asterix (*) have been studied.

Neartic Region	
C. acuducta Haldeman, 1843*	eastern U.S.A.
C. americana Dejean, 1831*	eastern Canada and U.S.A.
C. californica Van Dyke, 1925	California
C. morio Dejean, 1831*	Louisiana and Texas
C. rufa LeConte, 1843*	eastern U.S.A.
Palaearctic Region	
C. kochi Schatzmayr, 1936	Egypt
C. laevifrons Chaudoir, 1842*	widespread
C. niponensis Bates, 1873*	Japan & China (Hebei)
C. sacra Putzeys, 1875	Middle East
C. subterranea Decu, Nitzu & Juberthie, 1994	Romania
C. tutancamon Schatzmayr, 1936	Egypt, Eritrea
Oriental Region	
C. baenningeri Kult, 1951	Indonesia (Java, Sumatra), Philippines
C. balfourbrownei Kult, 1951	India
C. birmanica Kult, 1951	Myanmar
C. championi Kult, 1951	India (Kumaon)
C. convexicollis Putzeys, 1861	Indonesia (Java, Sulawesi)
C. coomani Kult, 1951	Vietnam
C. fulvaster Motschulsky, 1861	SE India, Sri Lanka
C. hoberlandti Kult, 1951	Indonesia (Sumatra)
C. mordax marginicollis Putzeys, 1866	Myanmar
C. mordax mordax Putzeys, 1861	Bengal, Myanmar
C. obenbergeri Kult, 1951*	India
C. opacidermis Baehr, 1989	Thailand
C. pfefferi Kult, 1951	India (Goa)
C. placida Putzeys, 1866	Indonesia (Sulawesi)
C. saigonica drescheri Kult, 1951	Borneo, Indonesia (Java, Sulawesi)
C. saigonica saigonica Kult, 1951	Vietnam
C. semicarinata Putzeys, 1877*	India
C. stigmatica Putzeys, 1866	Indonesia (Sulawesi)
C. tranquebarica Bonelli, 1813*	widespread
C. zebi Kult, 1951	Singapore, Indonesia, Borneo, Philippines
Afrotropical Region	
C. allaeri Kult, 1959	Zaire
C. alluaudi Kult, 1947	Madagascar
C. angolana angolana Kult, 1959	Angola, Zaire
C. angolana zambesiana Kult, 1959	Mozambique
C. antoinei Kult, 1959	Cameroon
C. aucta aethiopica Kult, 1959	Ethiopia
C. aucta aucta Erichson, 1843	southern Africa
C. basilewskyi Kult, 1959	Zaire
C. caffra caffra Putzeys, 1861	Mozambique

C. caffra dainellii Kult, 1959	Ethiopia
C. caffra heyrovskyi Kult, 1959	Zaire
C. capensis Kult, 1959	South Africa (Cape Province)
C. collarti collarti Burgeon, 1935	SW Zaire, E Congo
C. collarti gabonensis Kult, 1959	Gabon, Cameroon
C. consobrina Putzeys, 1866	western Africa
C. damarina Péringuey, 1896	Namibia
C. decellei Basilewsky, 1968	Ivory Coast
C. dewaillyi Kult, 1959	Mozambique, Zimbabwe, Tanzania, Somalia
C. erythropyga Putzeys, 1866	widespread
C. femoralis Putzeys, 1846	Senegal
C. girardi Kult, 1959	Angola
C. heinemanni heinemanni Kult, 1959	Tanzania
C. heinemanni minor Kult, 1959	Mozambique
C. insignis Kult, 1959	Zaire
C. interstitialis Kolbe, 1883	Angola, Zaire
C. jeanneli Kult, 1959	Kenya
C. katangana Kult, 1959	Zaire
C. kawa Basilewsky, 1948	Zaire
C. lacustris Putzeys, 1866	Tanzania, Botswana, South Africa
C. lebisi Kult, 1959	Ethiopia
C. martii Kult, 1959	Senegal
C. maxima Kult, 1959	Congo
C. montei Kult, 1959	east-central Africa
C. muelleri Kult, 1959	Zambia
C. natalensis curticollis Putzeys, 1873	Eritrea, Ethiopia
C. natalensis natalensis Putzeys, 1861*	widespread
C. ngayensis Burgeon, 1935	Zaire
C. orientalis Kult, 1959	Sudan, Tanzania
C. palmeni palmeni Kult, 1959	Zaire
C palmeni subsobrina Kult, 1959	Congo
C. perplexa congoensis Kult, 1951	west-central Africa
C. perplexa perplexa Péringuey, 1896	southern Africa
C. perplexa somalica Müller, 1942	east-central Africa
C. rugiceps Klug, 1832	widespread
C. schatzmayri Kult, 1959	Sudan, Tanzania
C. schoutedeni Kult, 1959	central Africa
C. sculptilis Putzeys, 1866	Tanzania, South Africa (Natal)
C. simplicifrons Fairmaire, 1901	Madagascar
C. sobrina Dejean, 1831	Senegal
C. straneoi Kult, 1959	Zaire
C. sudanensis Kult, 1959	Sudan, Ivory Coast
C. tanganyikana Kult, 1959	Tanzania
C. vosahloi Kult, 1959	Zaire

metasternum, measured at the shortest distance between the meso- and metacoxa, and length of metacoxa measured in the same line as the metasternum is 0.9–1.0 in *C. morio* while it is 1.2–1.5 in the other eastern species. The strial punctures in *C. morio* are also larger, those on the anterior half of the elytra being larger than the depression around the anterior discal seta while in the other species the strial punctures are subequal or smaller than the depression around the anterior discal seta.

The Eastern Hemisphere taxa

Despite having seen but few species, there is little doubt that *Leucocara* is well represented in the Eastern Hemisphere. The *tranquebarica* group, of which I have seen three species only, includes 15 species (Kult 1951: 18–24) and the *natalensis* group, of which I have studied but one species, consists of 43 species in Africa (Kult 1959: 179–206). One Asian species, *C. zebi* Kult, reaches the Australian Region where it is found in New Guinea, New Britain, and Australia (Darlington 1962: 362). The three Afrotropical species of the *rugiceps* group probably also belong to *Leucocara*. According to Kult (1959: 176), adults of the *rugiceps* group have also a small mesotibial protuberance but contrary to those of the *natalensis*-group have only one pair of preapical setae (instead of two) on abdominal sternum VII. On the other hand, the species of the *attenuata* group of the Oriental region (five species), despite having a small mesotibial protuberance, have the preapical setae equidistant on abdominal sternum VII (Kult 1951: 18), no discal setae on interval 3 (Kult 1951: 18), the labrum with six setae (Andrewes 1929: 353), and the glossal sclerite with two apical setae (checked on *C. striata* Putzeys only). In my opinion, this group of species is probably not closely related to *Leucocara* and would need a new subgeneric name.

All remaining groups of species previously included in the subgenus *Reichardtula* have a long, apically acuminate mesotibial protuberance (Fig. 3). As now restricted, this subgenus is probably, in my opinion, more closely related to *Clivina s. str.* and *Semiclivina* than to *Leucocara*. The only known significant character state shared between *Reichardtula* and *Leucocara* is the condition of the preapical setae on each side of sternum VII being proximate. Even if this character is eventually proven to be synapomorphic for these taxa, the clear, unambiguous difference in the mesotibial protuberance would justify the recognition of two distinct subgenera, considering the current classification schema of the genus *Clivina*.

Acknowledgments

I thank Igor S. Sokolov for notifying me of the presence of two specimens of *C. morio* in the Louisiana State Arthropod collection and for sending them. I also thank Patrice Bouchard, my co-worker, for reviewing an early draft of this paper and one anonymous reviewer. Both provided judicious comments that improved the presentation of this paper.

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